

# AIR SERVICE INFORMATION CIRCULAR

( AVIATION )

PUBLISHED BY THE CHIEF OF AIR SERVICE, WASHINGTON, D. C.

Vol. IV

December 1, 1922

No. 389

## PYROTECHNIC PROJECTOR AND AMMUNITION SUB- MITTED BY THE ORDNANCE DEPART- MENT FOR TEST

( ARMAMENT SECTION REPORT )



Prepared by Charles Leigh Paulus  
Engineering Division, Air Service  
McCook Field, Dayton, Ohio  
August 3, 1922



WASHINGTON  
GOVERNMENT PRINTING OFFICE  
1922

**CERTIFICATE:** By direction of the Secretary of War the matter contained herein is published as administrative information and is required for the proper transaction of the public business.

(2)

# PYROTECHNIC PROJECTOR AND AMMUNITION SUBMITTED BY THE ORDNANCE DEPARTMENT FOR TEST.

## OBJECT.

To test pyrotechnic projector and ammunition submitted by the Ordnance Department. This test to include installation of the projector and ground and air test of the ammunition.

## RECOMMENDATIONS.

Due to the fact that all tests described were satisfactory, it is recommended that this mechanism be used as a standard means of projecting signals for use upon aircraft. It is further recommended that the signals tested are entirely satisfactory for use in the Air Service at the present time.

## CONCLUSIONS.

It is concluded that the pyrotechnic projector as submitted by the Ordnance Department should be adopted for standard use in the Air Service. It is further concluded that the ammunition as furnished by the Ordnance Department is entirely satisfactory and should be adopted for standard use.

## DESCRIPTION.

Figure 1 shows a top quarter view of the pyrotechnic projector as submitted for test. This figure clearly demonstrates the rugged inexpensive construction used throughout the mechanism. Figure 2 shows the side view of the pyrotechnic projector loaded. This view of the mechanism shows the dovetail slide principle used in loading the signal and ejecting the empty shell. Figure 3 shows a top quarter view of the pyrotechnic projector with the slide in the open position. This figure demonstrates the possibility of loading, firing, and ejecting by the use of one hand. Figure 4 shows a bottom view of the mechanism. This figure shows the retaining plungers, the cartridge maintaining block, and the ejection mechanism. Figure 5 shows the ammunition submitted by the Ordnance Department for test. The outer diameters are knurled in such a way as to permit the various signals to be recognized through the sense of touch. The end of the ammunition is plainly marked to designate, by sight, the signal encased. These markings are shown in the figure and are, reading from left to right, "Y" yellow smoke, "RP" red parachute, "GC" green chain, and "WS" white star. Figure 6 shows the yellow-smoke signal disassembled. It will be observed that a small

parachute is attached to the smoke signal by use of a short length steel cable. This part of the mechanism is packed in the outer portion of the aluminum container and maintained in place by use of a felt washer, cardboard disk, and pressed steel cover. The opposite end of the mechanism contains the powder charge which propels the above-mentioned unit clear of the airplane, and is maintained in position by the rimmed member which contains the primer cap. Figure 7 shows the white-star signal disassembled. This mechanism contains the same firing unit described above. It contains a series of metal containers into which is compressed a brilliant burning powder mixture. Figure 8 shows a green-chain signal disassembled. This mechanism contains a parachute on the bottom of which is maintained a series of green burning powder charges.

## TEST.

The pyrotechnic projector as shown in Figures 8, 1, 3, and 4, was mounted on DH-4B and XB-1A airplanes. Both of these airplanes were active, during night flying tests of electric equipment, over a considerable period of time, and the ammunition described was used for signaling purposes. This arrangement permitted a practical duplication of service conditions; and although the projector was operated a great many times by varied personnel, no malfunction was encountered.

The yellow-smoke signals as shown in Figure 8, were fired in daylight and were found to burn approximately 30 seconds. These tests were observed from the ground, and it was found that the signals were visible for approximately 7 miles.

The white-star signals were tested during night flight tests, and these signals were found to burn approximately 5 seconds and to give a very brilliant penetrating white light.

The green-chain signals shown in Figure 8 were tested at night. These signals burn approximately 30 seconds and were clearly visible at an altitude of 5,000 feet.

The red-parachute signal, which is similar in construction to the yellow-smoke signal shown in Figure 6, was tested during night flight tests. These signals burn approximately 30 seconds and were visible from the ground at an altitude of 5,000 feet.

Although 200 rounds of the pyrotechnic projector ammunition described were fired during these tests, no malfunction which could be traced to the ammunition was encountered.

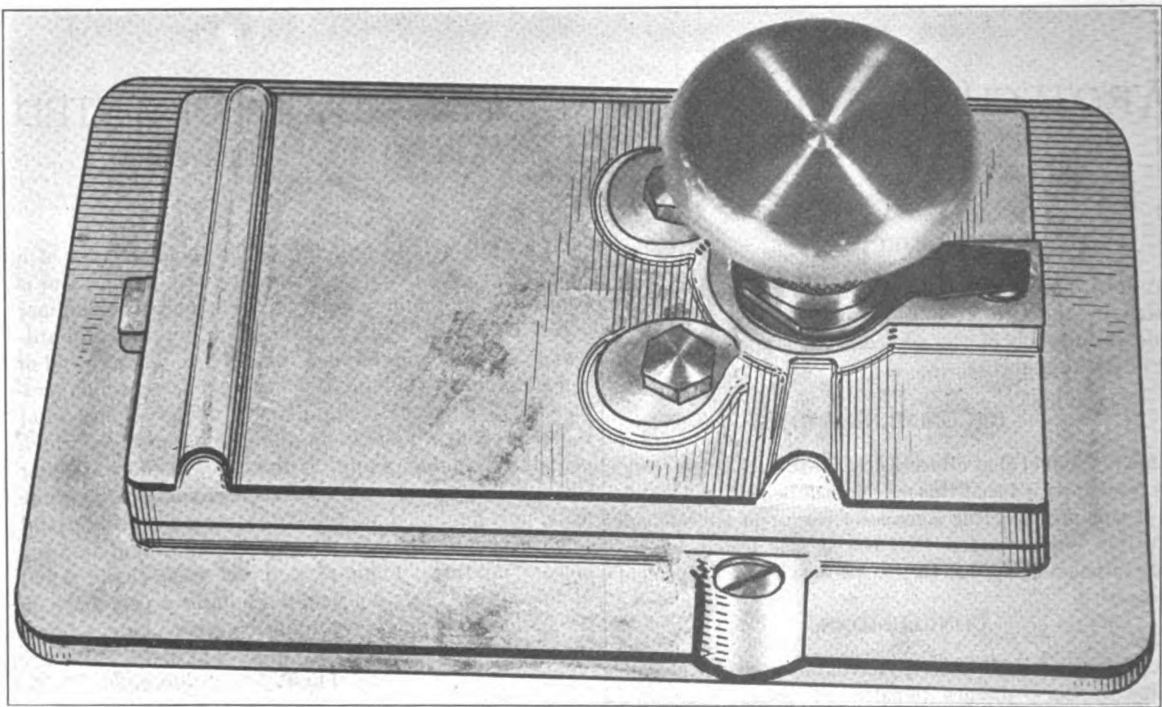


FIG. 1.—Pyrotechnic projector (top view).

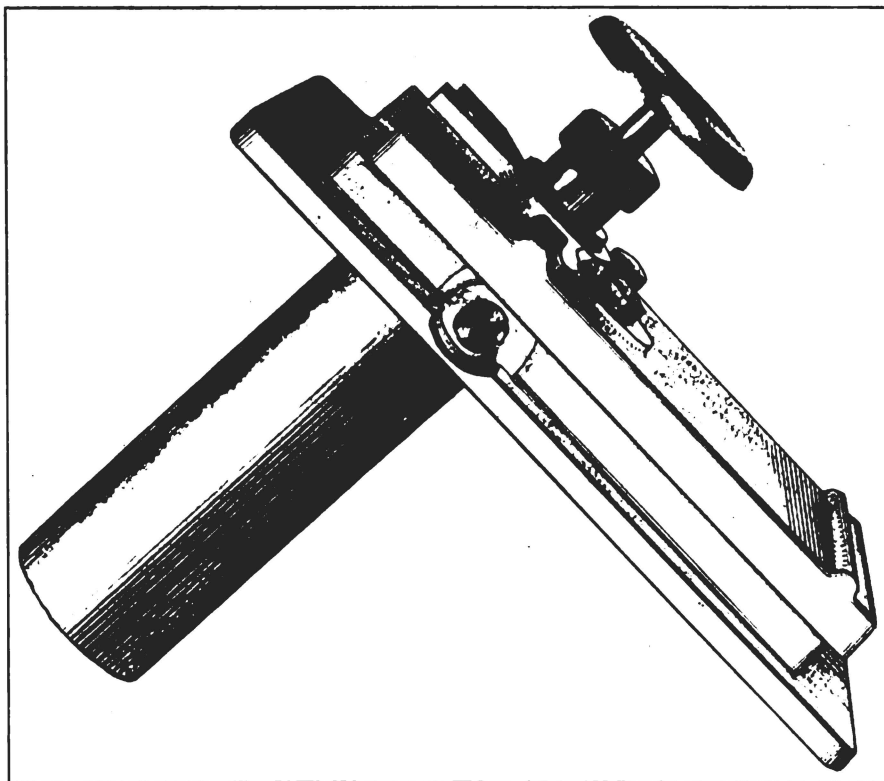


FIG. 2.—Pyrotechnic projector (side view loaded).

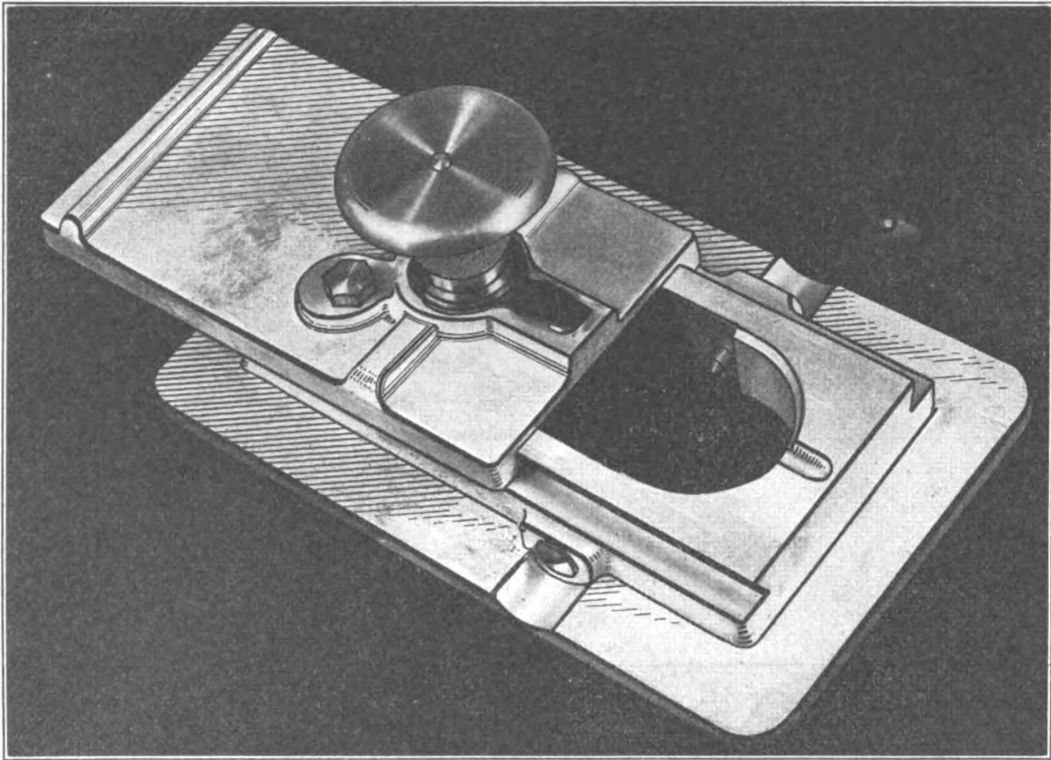


FIG. 3.—Pyrotechnic projector (quarter view).

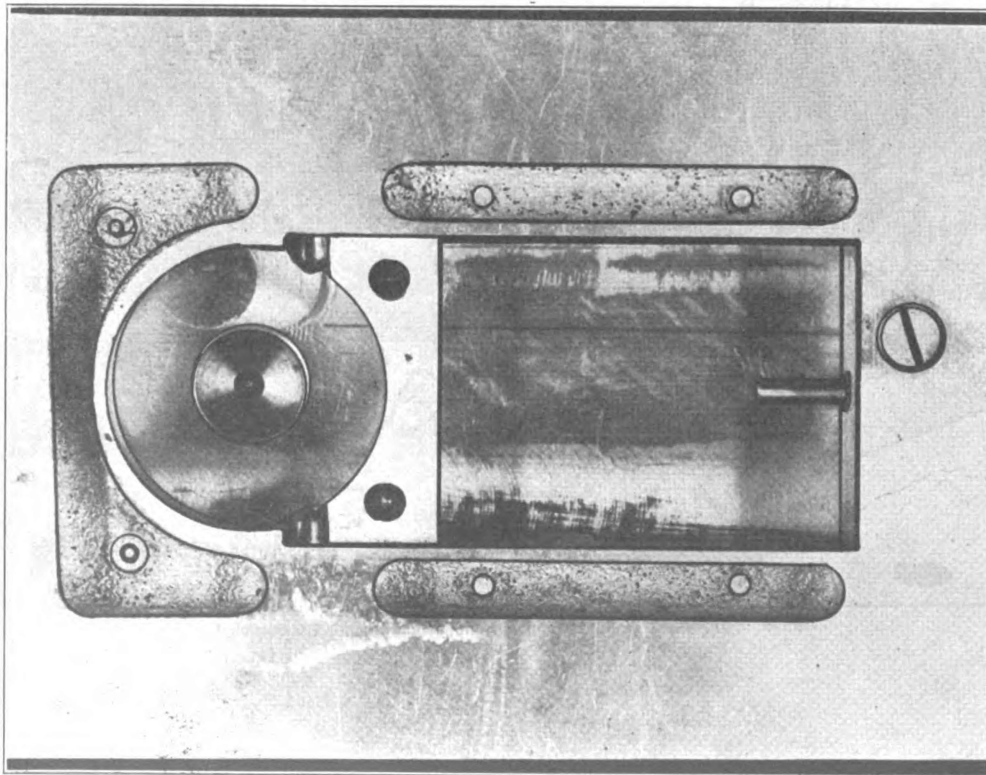


FIG. 4.—Pyrotechnic projector (bottom view).

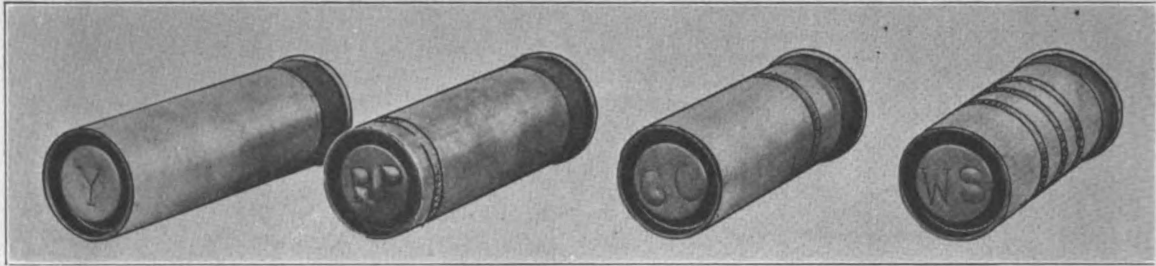


FIG. 5.—Pyrotechnic projector ammunition.

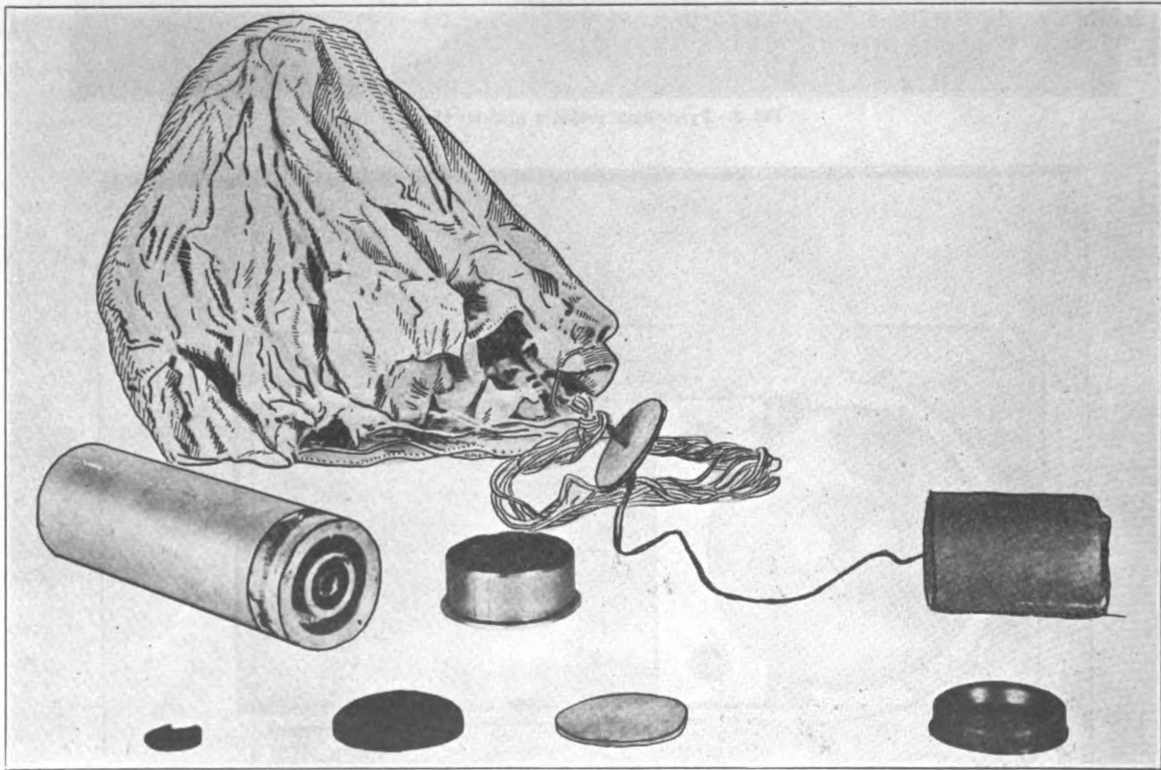


FIG. 6.—Pyrotechnic projector ammunition (yellow smoke) disassembled.

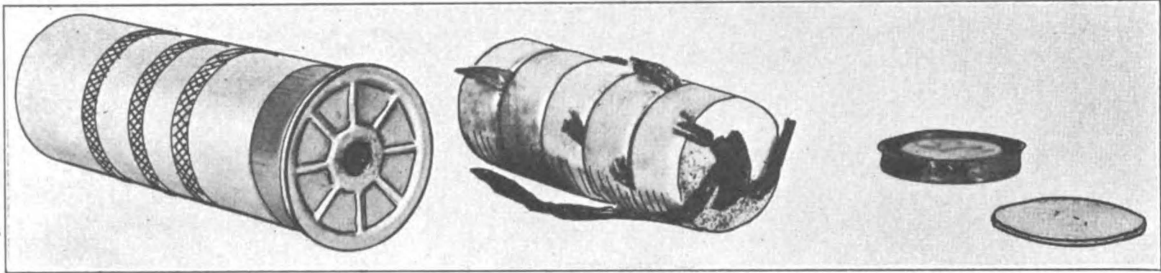


FIG. 7.—Pyrotechnic projector ammunition (white star) disassembled.

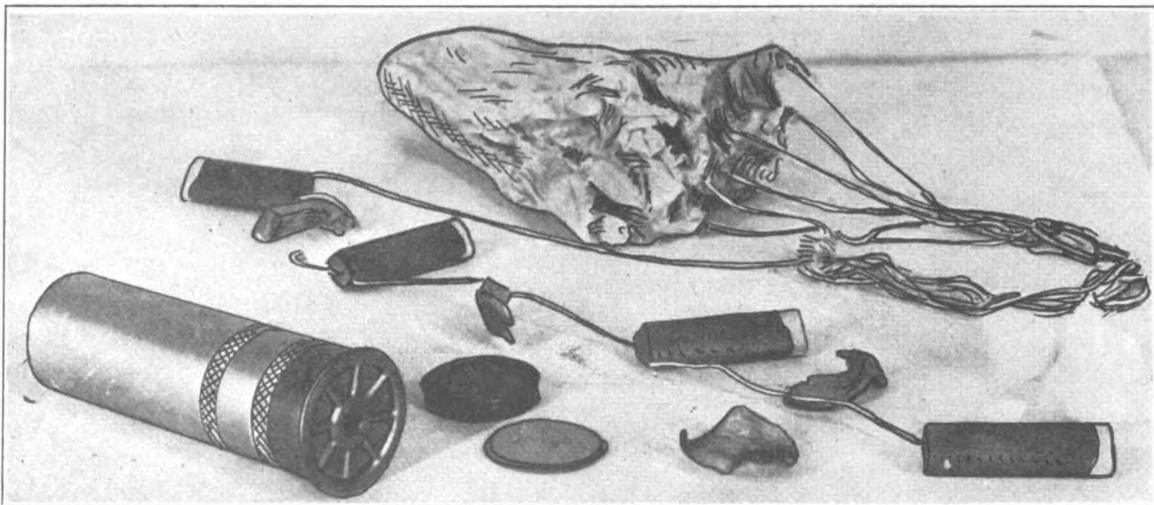


FIG. 8.—Pyrotechnic projector ammunition (green chain) disassembled.